

REMARKS

Claims 1 to 23 are all the claims pending in the application.

Claims 1, 4, 5, 7 and 9-11 have been rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative under 35 U.S.C. § 103(a) as obvious over EP 0 680 929.

Applicants submit that EP '929 does not disclose or render obvious the subject matter of claims 1, 4, 5, 7 and 9 to 11 and, accordingly, request withdrawal of this rejection.

The present invention as set forth in claim 1 is directed to a method for producing a particulate alumina, comprising heat-treating at a temperature of 1000 to 1600°C a composition comprising alumina, an alumina hydrate, ammonium chloride and a halogen compound other than ammonium chloride and then disintegrating the heat-treated product, and wherein the composition is previously granulated before heat-treating the composition.

The present invention as set forth in claim 5 is directed to a method for producing a particulate alumina, comprising heat-treating at a temperature of 1000 to 1600°C a composition comprising alumina, an alumina hydrate, ammonium chloride, a halogen compound other than ammonium chloride, and a boron compound then disintegrating the heat-treated product, and wherein the composition is previously granulated before heat-treating the composition.

Thus, in the present invention as set forth in claims 1 and 5, ammonium chloride and a halogen compound other than ammonium chloride are employed in combination to produce rounded alumina particles.

The present invention as set forth in claim 4 is directed to a method for producing a particulate alumina, comprising heat-treating at a temperature of 1000 to 1600°C a composition

comprising alumina, an alumina hydrate, ammonium chloride and a boron compound and then disintegrating the heat-treated product, and wherein the composition is previously granulated before heat-treating the composition.

Applicants submit that EP '929 does not disclose or suggest the subject matter of claims 1, 4 and 5.

EP '929 discloses a process for producing alpha alumina particles by granulating at least one alumina starting material selected from the group consisting of transitional alumina and an alumina compound to obtain particles, and calcining the particles in a halogen-containing atmosphere which comprises a halogen halide gas, a halogen gas or a mixture of a halogen gas and steam. The halogen-containing gas can be generated by supplying at least one gas source selected from the group consisting of solid and liquid hydrogen halide gas sources and solid and liquid halogen gas sources directly in a calcining system.

At page 6, lines 21-32, EP '929 discloses various solid or liquid sources of the hydrogen halide gas, including halogen containing compounds, such as, ammonium halide, for example, ammonium fluoride, ammonium chloride, ammonium bromide and ammonium iodide.

EP '929 does not specifically disclose that ammonium chloride and at least one halogen compound other than ammonium chloride should be employed together. In all of the working examples of EP '929, there is no disclosure of the combined use of ammonium chloride and a halogen compound other than ammonium chloride.

Examples 24-26 of EP '929 appear to be the only examples which employed ammonium chloride, but in these examples, a halogen compound other than ammonium chloride was not

employed. Example 26 of EP '929 discloses a mixture use of transition alumina powder, alpha alumina powder and ammonium chloride, which are granulated. The granules were then calcined.

The present specification contains Example 1, in which both ammonium chloride and a halogen compound other than ammonium chloride, namely, aluminum fluoride, were employed. Comparative Example 2 of the present specification is the same as Example 1, except that aluminum fluoride and boric acid were not added. As can be seen from Table 1, Comparative Example 2 resulted in particles not having a rounded shape and agglomerated particles were present, whereas Example 1 had rounded particles. Applicants submit that this comparison shows that the present invention achieves unexpected results as compared to EP '929.

EP '929 discloses the use of halides at other portions of the specification, but does not contain any example employing these halides. Thus, for example, at page 4, lines 24-28, EP '929 discloses the use of halides as seed crystals, but again, does not have any example showing the use of a halide as a seed crystal. Further, at page 4, lines 48-51, EP '929 discloses that halides generally can be used as a shape-regulating agent, but EP '929 does not contain any example employing a halide as a shape regulating agent.

In summary, EP '929 does not disclose or suggest using two kinds of halogen compounds in combination or the effects obtained by doing so.

Further, EP '929 does not disclose or suggest the subject matter of claim 4 of producing a particulate alumina by heat-treating at a temperature of 1000 to 1600°C a composition comprising alumina, an alumina hydrate, ammonium chloride and a boron compound and then

disintegrating the heat-treated product, and wherein the composition is previously granulated before heat-treating the composition.

In view of the above, applicants submit that that EP '929 does not disclose or render obvious the subject matter of claims 1, 4, 5, 7 and 9 to 11 and, accordingly, request withdrawal of this rejection.

Claims 1-23 have been rejected under 35 U.S.C. § 103(a) as obvious over EP 0 276 321 in view of EP 0 680 929.

Applicants submit that EP '321 and EP '929 do not disclose or render obvious the subject matter of claims 1 to 23 and, accordingly, request withdrawal of this rejection.

EP '321 discloses spherical corundum particles obtained by mixing pulverized alumina, or a mixture of alumina with aluminum hydroxide, with at least one of a halogen compound, especially a fluorine compound, a boron compound and alumina hydrate, heat treating the mixture at 1,000°C or above, and crushing the product. EP '321, however, does not disclose the combined use of ammonium chloride and a halogen compound other than ammonium chloride, and does not disclose that the composition is previously granulated before heat treating the composition, as recited in claims 1 and 5.

Further, EP '321 does not disclose or suggest the use of alumina, an alumina hydrate, ammonium chloride and a boron compound as recited in claim 4.

The Examiner relies on EP '929 for a disclosure of heat treating aluminum hydroxide with ammonium chloride. The Examiner argues that it would have been obvious to employ ammonium chloride in EP '321 in view of the teachings of EP '929.

Applicants submit that EP '929 does not supply the deficiencies of EP '321 with respect to the use of ammonium chloride.

As discussed above, EP '929 discloses a process for producing alpha alumina particles by granulating at least one alumina starting material selected from the group consisting of transitional alumina and an alumina compound to obtain particles, and calcining the particles in a halogen-containing atmosphere which comprises a halogen halide gas, a halogen gas or a mixture of a halogen gas and steam. The halogen-containing gas can be generated by supplying at least one gas source selected from the group consisting of solid and liquid hydrogen halide gas sources and solid and liquid halogen gas sources directly in a calcining system.

At page 6, lines 21-32, EP '929 discloses various solid or liquid sources of the hydrogen halide gas, including halogen containing compounds, such as, ammonium halide, for example, ammonium fluoride, ammonium chloride, ammonium bromide and ammonium iodide.

EP '929 does not specifically disclose that ammonium chloride and at least one halogen compound other than ammonium chloride should be employed together. In all of the working examples of EP '929, there is no disclosure of the combined use of ammonium chloride and a halogen compound other than ammonium chloride.

Examples 24-26 of EP '929 appear to be the only examples which employed ammonium chloride, but in these examples, a halogen compound other than ammonium chloride was not employed. Example 26 of EP '929 discloses a mixture use of transition alumina powder, alpha alumina powder and ammonium chloride, which are granulated. The granules were then calcined.

The present specification contains Example 1, in which both ammonium chloride and a halogen compound other than ammonium chloride, namely, aluminum fluoride, were employed. Comparative Example 2 of the present specification is the same as Example 1, except that aluminum fluoride and boric acid were not added. As can be seen from Table 1, Comparative Example 2 resulted in particles not having a rounded shape and agglomerated particles were present, whereas Example 1 had rounded particles. Applicants submit that this comparison shows that the present invention achieves unexpected results as compared to EP '929.

As can be seen from the above discussion, EP '929 does not disclose the combined use of ammonium chloride and a halogen compound other than ammonium chloride. Further, as discussed above, the present specification shows that the combined use of ammonium chloride and a halogen compound other than ammonium chloride produces unexpected results, as can be seen from the Example 1 and Comparative Example 2 to the present specification.

Accordingly, the combination of EP '321 with EP '929 would not have led one of ordinary skill in the art to the subject matter of claims 1 and 5.

Further, EP 929 does not disclose or suggest the subject matter of claim 4 of producing a particulate alumina by heat-treating at a temperature of 1000 to 1600°C a composition comprising alumina, an alumina hydrate, ammonium chloride and a boron compound and then disintegrating the heat-treated product, and wherein the composition is previously granulated before heat-treating the composition.

In view of the above, applicants submit that EP '321 and EP '929 do not disclose or render obvious the subject matter of claims 1 to 23 and, accordingly, request withdrawal of this rejection.

Claims 1-23 have been rejected under 35 U.S.C. § 103(a) as obvious over WO 02/098,796 in view of EP '929.

Applicants submit that WO '796 and EP '929 do not disclose or render obvious the subject matter of claims 1 to 23 and, accordingly, request withdrawal of this rejection.

This rejection is similar to the rejection above, except that the Examiner now relies on WO '796 as the primary reference instead of EP '321.

WO '796 discloses alumina particles obtained by granulating a mixture of alumina and at least one compound selected from halogen compounds, boron compounds and alumina hydrates, but it does not disclose or suggest using two kinds of halogen compounds in combination as recited in claims 1 and 5.

Further, WO '796 does not disclose or suggest the use of alumina, an alumina hydrate, ammonium chloride and a boron compound as recited in claim 4.

Moreover, the present invention can achieve production of rounded particles when all of the three components, i.e. an alumina hydrate, ammonium chloride and a halogen compound other than ammonium chloride are added to alumina.

Further, the present invention can exhibit its effect of reducing epoxy viscosity and silicone viscosity when the particles are blended into a polymer compound, thereby realizing high fillability. See Table 1 of the present specification.

Also, as shown at Table 1 of the present specification, the results of Comparative Example 1, which is similar to the working Examples 1-5 of WO '796, do not include any effects obtained by the present invention.

That is, not only can the present invention obtain rounded particles, but the present invention also can achieve a reduced viscosity when the particles are blended with resin. Therefore the present invention can provide extremely useful particles used for production of polymer compositions having high fillability.

The present invention can obtain rounded particles excellent in kneadability with resin (achieving low viscosity) by using two kinds of halides. This technique is not suggested by the results described in WO '796.

Applicants submit that EP '929 does not supply the deficiencies of WO '796.

As discussed above, EP '929 discloses a process for producing alpha alumina particles by granulating at least one alumina starting material selected from the group consisting of transitional alumina and an alumina compound to obtain particles, and calcining the particles in a halogen-containing atmosphere which comprises a halogen halide gas, a halogen gas or a mixture of a halogen gas and steam. The halogen-containing gas can be generated by supplying at least one gas source selected from the group consisting of solid and liquid hydrogen halide gas sources and solid and liquid halogen gas sources directly in a calcining system.

At page 6, lines 21-32, EP '929 discloses various solid or liquid sources of the hydrogen halide gas, including halogen containing compounds, such as, ammonium halide, for example, ammonium fluoride, ammonium chloride, ammonium bromide and ammonium iodide.

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As can be seen from the above discussion, EP '929 does not disclose the combined use of ammonium chloride and a halogen compound other than ammonium chloride. Further, as discussed above, the present specification shows that the combined use of ammonium chloride and a halogen compound other than ammonium chloride produces unexpected results, as can be seen from the Example 1 and Comparative Example 2 to the present specification.

Accordingly, the combination of WO '796 with EP '929 would not have led one or ordinary skill in the art to the subject matter of claims 1 and 5.

Further, EP '929 does not disclose or suggest the subject matter of claim 4 of producing a particulate alumina by heat-treating at a temperature of 1000 to 1600°C a composition comprising alumina, an alumina hydrate, ammonium chloride and a boron compound and then disintegrating the heat-treated product, and wherein the composition is previously granulated before heat-treating the composition.

In view of the above, applicants submit that WO '796 and EP '929 do not disclose or render obvious the subject matter of claims 1 to 23 and, accordingly, request withdrawal of this rejection.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

RESPONSE UNDER 37 C.F.R. § 1.116
Application No.: 10/560,246

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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CUSTOMER NUMBER

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